Phytologia (May 1989) 66(3):228-235

REMARKS ON THE GENUS *PTEROSTEGIA* (POLYGONACEAE: ERIOGONOIDEAE)

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Abstract

The genus *Pterostegia* is a monospecific taxon ranging from California, eastward to southern Nevada and adjacent southwestern Utah, western Arizona and northwestern México. An annual, it is related to the Baja California perennial *Harfordia*, and together they compose the tribe Pterostegieae of the subf. Eriogonoideae (Polygonaceae). The genus and its single species are described, a lectotype selected for the species, and representative specimens are listed documenting its known distribution.

KEY WORDS: Polygonaceae, taxonomy, *Pterostegia*, California, México.

INTRODUCTION

The genus *Pterostegia* was proposed by Fischer and Meyer in a work devoted to plants grown in the botanical garden in St. Petersburg, later Petrograd (1914-1924) and now Leningrad. Friedrich Ernst Ludwig von Fischer (1782-1854) was director of the garden from 1823 until 1850. From 1835 until late 1846, Fischer, along with various coauthors, published numerous new species and genera found from throughout the world that were in cultivation at the garden. Many of the western North American species were described jointly with Carl Anton von Meyer (1795-1855). Meyer was a botanical explorer who traveled widely, mainly in Russia, became an assistant to Fischer in 1832, and replaced him as director when Fischer resigned in 1850.

The history of Russian botanical efforts in California have been documented elsewhere (Essig 1933; Howell 1937; Alden & Ifft 1943; McKelvey 1955; Thomas 1969).

The Russians had come early to the California coast, with the surgeon-naturalist Georg Heinrich von Langsdorff (1774-1852) on the Krusenstern expedition (1803-1807) visiting the San Francisco region from late March to mid June of 1806. Langsdorff was able to make a small collection in spite of numerous difficulties (Langsdorff 1813-1814), but only a few of his North American species were described early enough to be nomenclaturally significant. The Russians returned in 1812 to establish an ice-free, warm-weather outpost near Bodega Bay and at Fort Ross north of San Francisco to assist in maintaining their operations to the north in Alaska. Four years later Johann Friedrich Gustav von Eschscholtz (1793-1831) and Ludolf Adelbert von Chamisso (1781-1838) arrived in California aboard the *Rurick* to begin one of the most intense perîod of natural history investigation in California during the first half of the nineteenth century (Jepson 1929; Mahr 1932; Eastwood 1939, 1944; Lincoln 1966; McClintock 1967). Not only did Eschscholtz and Chamisso discover numerous species of vascular plants that would be published in various articles appearing in the first ten volumes

of *Linnaea*, of which several were from California, but they also established the concept of intense biological studies at Fort Ross that was followed by a host of naturalists up to the point when the Fort was abandoned by the Russians in December of 1841.

The place in this story of the plant that Fischer and Meyer (1836) would eventually name *Pterostegia drymarioides* began after the adventures of Eschscholtz and Chamisso, the best known of the Russian botanical collectors in California. The Baron Ferdinand Petrovitch Wrangel (or Wrangell) arrived in California in 1829 where he eventually assumed the position of governor of the Russian colony (1831-1836). Brewer (1880) stated that the governor maintain his residence at Bodega, but he did visit Fort Ross from time to time (Ogden 1933). While Wrangel was governor he was an active collector sending specimens and seeds to the botanic garden in St. Petersburg. Also during his term of office, several naturalists visited northern California, especially entomologists. Even Eschscholtz returned in 1829 to collect insects (Essig 1933). Ilya G. Vosnesensky (or Wosnessensky) was one of the few entomologists who would make extensive botanical collections.

Taxonomy

Pterostegia Fischer & C. Meyer, Index Sem. Hort. Petrop. 2: 48. 1836.–Type: *Pterostegia drymarioides* Fischer & C. Meyer.

Sprawling and spreading, mostly thinly pubescent, monoecious annual herbs arising from a slender taproot; *leaves* cauline, opposite, exstipulate, petiolate, the blades broadly elliptic to fan-shaped, entire to variously lobed, glabrous or pubescent, thin, the petioles basally connate at the non-swollen nodes; *flowering stems* thin and wiry, dichotomous throughout, green to red, hirsute; *branches* numerous, dichotomously branched throughout, the secondaries suppressed at the upper nodes, those at the lower nodes short and filiform, often peduncle-like in position but terminated by a pair of opposite leaves at the terminal node; *inflorescences* cymose with the flowers arranged in axillary clusters; *bracts* lacking; *peduncles* lacking; *involucres* composed of a highly modified involucral bract, this situated lateral of and basal to a short, slender pedicel, surrounding but basal to the immature female flower with the immature modified sheath of the bract spreading until after fertilization then becoming erect and surrounding the achene, the upper portion of the vertical sheath entire or variously lobed or notched along its margin, the two lateral wings basal to the immature sheath, these becoming slightly gibbous on the abaxial surface with age with the adaxial surface invaginated and its outer margins slightly enlarged, the whole cream or tinged with pink or rose, hyaline and reticulated with faint cream colored veins, glabrous or pubescent; *flowers* imperfect, 2-3 per node, pale yellow to pink or rose, sparsely pubescent along the midribs and base without, the tepals (5) 6, petaloid, essentially monomorphic, lanceolate, united about one-third of their length; *stamens* 6, mostly included, the filaments glabrous, the anthers yellow, oval; *achenes* strongly 3-angled, yellowish-brown to brown, glabrous, winged throughout, the narrow base tapering to a 3-angled beak, the embryo straight, in abundant endosperm; $2n = 28$ (fide Munz 1958).

A monospecific genus of western North America ranging from northern California south to northern Baja California, México, eastward across southern Nevada to southwestern Utah and Arizona.

Torrey and Gray (1870) segregated *Pterostegia* from the remainder of the eriogonoid genera referring it to a new tribe, Pterostegieae. Although they failed to give a formal description of the taxon, it is diagnostically characterized in their key to the tribes and genera so that

the name is validly published (Art. 32; Greuter 1988). The tribe now includes two genera, *Pterostegia* and *Harfordia* E. Greene & C. Parry in C. Parry (Reveal 1989), both monospecific.

Like *Harfordia*, the involucral bract of *Pterostegia* is highly modified into a slightly gibbous, reticulated, winged structure that encloses the mature achene. Its development is similar to that of its perennial relative, but it never obtains the size, prominence or bright colorization of the involucral bract seen in *Harfordia*. The ventral side of the bract in *Pterostegia* is not keeled nor enlarged as is the case in *Harfordia*, nor are the two lateral wings truly inflated. The dorsal opening resembles that found in *Harfordia*, but the apex of the vertical sheath is elongated and entire or notched rather than low and flat. The two wings are not inflated as just noted. Instead in *Pterostegia* the outer margin of the body of each wing is invaginated so that into the cavity created by the slightly gibbose abaxial surface, the enrolled margin forms a short flap that encloses a small portion of that cavity.

Like in *Harfordia*, the modified involucral bracts must aid in the dispersal of the achenes. Both the bract and achene are taken by birds, which undoubtly accounts for the plants wide distribution, but to what extent mature bracts are blown about with achenes inside is unknown.

1. **Pterostegia drymarioides** Fischer & C. Meyer, Index Sem. Hort. Petrop. 2: 48. 1836.–LECTOTYPE: "in Portu Bodega," but more likely near Fort Ross, Sonoma Co., California, 1833 (but labelled 1834), *Wrangel s.n.* (holotype: LE!, selected here.)

   Pterostegia diphylla Nutt., Proc. Acad. Nat. Sci. Philadelphia 4: 18. 1848.–TYPE: near Santa Barbara, Santa Barbara Co., California, 1836, *Nuttall s.n.* (holotype: PH!; isotype: K!).

   Pterostegia diphylla Nutt. var. *biloba* Nutt., Proc. Acad. Nat. Sci. Philadelphia 4: 18. 1848.–TYPE: near Santa Barbara, Santa Barbara Co., California, 1836, *Nuttall s.n.* (holotype: BM!; isotype: GH!).

   Pterostegia microphylla Nutt., Proc. Acad. Nat. Sci. Philadelphia 4: 18. 1848.–TYPE: near Santa Barbara, Santa Barbara Co., California, 1836, *Nuttall s.n.* (holotype: BM!; isotypes: GH, K!).

Monoecious, spreading and sprawling, thinly pubescent annual herb 0.1-10 (12) dm across, dichotomously branched throughout, green to red; *leaves* opposite, broadly elliptic to fan-shaped, entire or variously bilobed, 0.3-2 cm long, 0.5-2.5 (3) cm wide, glabrous or pubescent, the petiole slender and usually pubescent, 0.2-0.6 (1) cm long; *inflorescences* cymose with flowers in axillary clusters; *involucres* reduced to a highly modified involucral bract, 1-1.5 (3) mm long, (1.5) 2-3 (3.5) mm wide, the vertical sheath entire or variously erose to shallowly lobed, the two lateral wings slightly gibbous abaxially, invaginated adaxially, reticulate, glabrous or pubescent; *flowers* imperfect, 0.9-1.2 mm long, pale yellow to pink or rose, sparsely pubescent, the tepals (5) 6, lanceolate; *stamens* 6, included, the filaments 0.5-0.6 mm long, glabrous, the anthers 0.2-0.3 mm long, oval, yellow; *achenes* yellowish-brown to brown, 1.2-1.5 mm long, the narrowly globose base tapering to a winged, strongly 3-angled beak; $n = 14$.

Widespread and common mainly in shady places from northern California southward throughout much of the state to northern Baja California, México, including the off-shore islands from Angel Island south to Guadalupe Island, and eastward across Lincoln and Clark cos., Nevada, to Washington Co., southwestern Utah, southward in western Arizona from Mohave and Coconino cos. south to Gila, Pima, Pinal and Yuma cos., from near sea level to 5000 ft elev; flowering from Mar-Jul.

Representative Specimens. – MEXICO. Baja California Norte: Los Arbolitos, Punta Banda, SW of Ensenada, 27 Apr 1978, *Ertter et al. 2694* (BRY, MARY, NY); South Todos Santos Island, 7 Apr 1948, *Moran 2786* (UC); Guadalupe Island, NE anchorage, 12 Apr 1948, *Moran 2897* (DS, SD); San Martin Island, Hassler Cove, 10 Apr 1963, *Moran 10511* (ARIZ, COLO, DS, MICH, RSA, SD, UC); San Martin Island, summit crater, 11 Apr 1963, *Moran 10562* (DS, LL, SBBG, SD, UC, W); W slope of Cerro San Juan de Dios, 1 May 1973, *Moran 20682* (SD); canyon E of San Isidro, Sierra San Pedro Martír, 1 Jun 1975, *Moran 22205* (SD); 4 km NE of Jacomun, Sierra Juárez, 14 May 1977, *Moran 24024* (SD); Guadalupe Island, 1875, *Palmer 84* (BM, G, GH, K, MO, NY, PH); San Quintín Bay, Jan 1889, *Palmer 667* (ARIZ, BR, CAS, DS, MICH, UC, US); Cedros Island, 18-20 Mar 1889, *Palmer 710* (F, GH, K, NY, US); along México Highway 3, 12.6 mi S of México Highway 2 in Tecate, 21 May 1988, *Reveal 6845* (BRY, CAS, MARY, MEXU, MO, RSA, WIS); Escondido Creek, 13 mi S of Punta Prieta, 23 Feb 1935, *Shreve 6916a* (ARIZ, US); 11 mi E of San Telmo, 4 May 1941, *Wiggins 9741* (DS, US). Michoacán: Morelia, near the prison, Aug 1927, *Arsené s.n.* (Z). UNITED STATES. Arizona: Coconino Co.: side canyon at Colorado River Mile 184, Grand Canyon, Apr 1975, *Theroux 1199* (ARIZ, MNA). Gila Co.: San Carlos Indian Reservation, Cassadore Spring Canyon, 20 mi N of San Carlos, 29 Mar 1935, *Maguire et al. 10321* (ARIZ, BRY, DAO, GH, NY, UTC, WTU); W end of Canyon Lake, Apache Trail, 2 May 1935, *Nelson & Nelson 1731* (G, K, MO, NY, RM, SMU, UC, UTC). Maricopa Co.: Tempe, Papago Park, 19 Feb 1932, *Gillespie 8811* (DS, GH, NY, POM, UC, US); Canyon Lake, 16 Mar 1935, *Peebles 10757* (ARIZ, MICH, POM). Mohave Co.: Virgin Narrows, 18 mi S of St. George along Interstate Highway 15, 24 Mar 1973, *Atwood 4396* (BRY, COLO, MO, US, UT). Pima Co.: canyons of the Santa Catalina Mountains, 11 Apr 1881, *Pringle s.n.* (G, GH, LE, NY, PENN, PH, VT, WS); Sabino Canyon, Santa Catalina Mountains, 3 Apr 1941, *Shreve 10118* (ARIZ, COLO, DS, MICH, UC); Organ Pipe Cactus National Monument, Alamo Canyon, 2 Apr 1982, *Siplivinsky et al. 2720* (CAN, COLO, RM, TEX, UCR, UTC). Pinal Co.: Superstition Mountains, 26 Mar 1932, *Gillespie 5495* (DS, US); 2 mi below Coolidge Dam along the Gila River, 3 Apr 1935, *Maguire 10435* (BRY, DAO, NY, UTC). Yavapai Co.: 5 mi N of Congress Junction, 9 Apr 1947, *Gould & Darrow 3642* (ARIZ); Hillside, 1 May 1903, *M.E. Jones s.n.* (BKL, CAS, DS, POM); Lake Pleasant Regional Park, Cottonwood Creek, 31 Mar 1976, *Lehto 19728* (ASU). Yuma Co.: Havasu National Wildlife Refuge on low hills S of Bill Williams River, 1.8 mi E of Arizona Highway 95, 25 Feb 1973, *Russell & Kobetich 73-101* (ASU). California: Alameda Co.: west base of Mt. Diablo, 1868, *Gibbons s.n.* (GOET, MPU, WU); Grizzly Peak, Berkeley Hills, 29 Apr 1933, *Tracy 12077* (DAO, UC). Amador Co.: Fisher's Cabin, 17 Apr 1893, *Hansen 316* (E, G, MIN, NY, US). Butte Co.: Chico, Mar 1883, *Austin s.n.* (NY, US); Stilson Canyon E of Chico, 13 Apr 1916, *Heller s.n.* (F, PENN). Calaveras Co.: Angeles Camp, 11 Apr 1923, *Eastwood 11650* (CAS); E edge of North Shore Camp, New Hogan Reservoir, 20 Apr 1972, *McNeal 770* (CPH, NY). Colusa Co.: along Bear Valley Road 1.5 mi from California Highway 20, 22 Apr 1978, *Logan 63* (HSC). Contra Costa Co.: slopes of Mt. Diablo, 27 Apr 1940, *H.S. Reed 346* (DAO, OKL). El Dorado Co.: 0.5-1 mi NW of Chili Bar on the South Fork of the American River, 8 Apr 1978, *Smith & Stebbins 7807* (CAS). Fresno Co.: 5.5 mi NE of Academy, 10 May 1954, *Howell & Barneby 29328* (CAS); Alcalde Hills, 12 mi W of Coalinga Canyon of Los Gatos Creek E of White Creek, 24 Mar 1986, *Janeway & Janeway 1398* (CHSC); along Kings River in upper Pine Flat, 0.7 mi above old Pine Flat School, 24 Mar 1953, *Quibell & Quibell 1720* (RM, RSA). Glenn Co.: 8 mi S of Elk Creek on Stony Ford Road, 13 Apr 1971, *Maze et al. 931* (NY, WTU). Humboldt Co.: Cape Mendocino, near ocean shore, 20 May 1933, *Tracy 12226* (DS, GH, NY, UC, UTC, WS, WTU). Imperial Co.: Mountain Springs Road exit off Interstate 8, 0.3 mi E of Mountain Springs at head of Myer Creek, 10 Mar 1986, *Sanders et al. 6275* (UCR). Inyo Co.: Surprise Canyon, Panamint Range, 15 Apr 1891, *Coville & Funston 646* (DS, F, GH, K, LE, MIN, MO, MSC, NY, PH, US); Alabama Hills, S of Lone Pine Creek, 1 May 1974, *DeDecker 3421* (CAS, RSA, WS); Goler Canyon, Panamint Range, 25 Mar 1937, *Train s.n.* (ARIZ, COLO, DS, ILL, NEB, OSC, RSA, US). Kern Co.: Sunset, 20 Apr 1902, *Heller 7731* (ARIZ, BKL, E, G, GH, ISC, MO, NY, PH, US); Kern Canyon, 1 mi above its mouth, 26 Apr 1905, *Heller 7780* (BKL, E, G, ISC, MIN, MO, NY, PH, US); Long Tom Mine, Greenhorn Mountains, 26 Apr 1965, *Twisselmann 10615* (CAS, NY, RSA). Lake Co.: on the shore of Clear Lake, 3 mi S of Lucerne, 20 Apr 1963, *Breedlove 4581* (SMU). Los Angeles Co.: Mandeville Canyon, Santa Monica Mountains, Mar 1929, *Clokey & Templeton 4523* (CM, F, G, GH, ILL, K, LE, MARY, MICH, MIN, MONTU, ND, NO, OKL, PENN, POM, RM, RSA, UC, US, UTC, WS); Glendora, 7 May 1904, *Grant & Wheeler 1057* (BKL, F, GH, ILL, NESH, NMC, PH, RM, UC); San Clemente Island, Middle Ranch, 17 Feb 1941, *Moran 576* (DS, MARY, MO, NY, RSA, SBBG, SD, WTU); Renton Mine, Santa Catalina Island, 22 Jun 1965, *Thorne & Everett 34844* (RSA, SBBG, SD). Madera Co.: Raymond, 8 May 1925, *Eastwood 12511* (CAS). Marin Co.: San Rafael Hills, 6 May 1945, *J.T. Howell 20806* (CAS, UC); NW side of Angel Island, 2 May 1967, *Raven & Johnson 21331* (DS); Point Reyes Bird Observatory, Arroyo Hondo, 3 mi NW of Bolinas, 20 Feb 1970, *True & Ross 5178* (CAS). Mariposa Co.: mountains above Exchequer Dam on the Merced River, 30 Apr 1949, *Rodin 4913* (BR, CAN, COLO, UC, WS); Bear Mountain, 1865, *Torrey 431* (GH, MIN, NY, US). Mendocino Co.: trail around Leonard Lake, head of Reeves Canyon, 21 May 1980, *G.L. Smith 5767* (CAS); Monterey Co.: Tassajara Hot Springs, Jun 1901, *Elmer 3252* (DS, G, K, MIN, ORE, US); Pacific Grove, Apr 1902, *Elmer 3557* (BKL, CAS, COLO, DS, E, G, GH, K, MICH, MIN, MO, NY, POM, SBBG, SMU,

UC, US, VT, WTU, Z); Arroyo Seco Road, W of Greenfield and just W of the junction with Carmel Valley Road, 11 May 1980, *Erter & Strachan 3343* (CAS, MARY, NY, SD); 8 mi N of Carmel Valley, Santa Lucia Mountains, 27 Apr 1957, *J.T. Howell 32037* (CAS, RSA, W). Napa Co.: Wooden Valley Grade, W side of Napa Valley, 2 Apr 1931, *Keck 1024* (DS, POM). Nevada Co.: Rock Creek, 14 mi E of Wheatland, 25 Mar 1965, *True 1759* (CAS). Orange Co.: Silverado Canyon, Santa Ana Mountains, 20 Apr 1920, *Munz & Harwood 3724* (PH, POM, RM); 0.5 km W of Dana Point Harbor, 0.8 km SSW of the R.H. Dana School, Dana Point Headlands, 3 Apr 1982, *Roberts & Fritzke 498* (UCSB). Riverside Co.: Oasis de los Osos Preserve, off Snow Creek Canyon at the N foot of the San Jacinto Mountains, 1 mi W of Snow Creek Village, 9 Apr 1985, *Fellows & Sanders 125* (HSC, OBI, UCR); 8 mi SE of Corona along road to Elsinore, 17 Mar 1964, *Hitchcock & Muhlick 23079* (F, HSC, NY, WS); 1 mi below Cottonwood Spring, Joshua Tree National Monument, 1 Apr 1940, *C.L. Hitchcock 5909* (DS, MO, NY, RSA, UC, UTC, WTU); San Jacinto Mountains, 1 Jul 1934, *Stokes 313* (CAS, DS, G, GH, K, MICH, MIN, NY, POM, UC, US, UTC, Z). Sacramento Co.: near Folsom, 22 Apr 1928, *Copeland 531* (MARY, POM). San Benito Co.: 1.2 mi SW of Gabilan School, 20 May 1936, *Belshaw 2165* (UC). San Bernardino Co.: 4 mi E of Victorville, 18 Apr 1941, *Alexander & Kellogg 2024* (DS, GH, UC, UTC); Cucamonga Wash, NE of Upland, 1 Mar 1917, *I.M. Johnston 1352* (DS, MONTU, POM, UC, WTU); near Bonanza, Providence Mountains, 30 Mar 1920, *Munz & Harwood 3536* (BKL, DS, POM, RM); Sacramento Mountains, South Pass, 20 mi W of Needles along U.S. Highway 66, 1 Apr 1958, *Smith & Hansen 95* (RSA); Arrowhead Canyon, 7 May 1919, *Spencer 1105* (CAS, GH, NY, POM); Willow Spring Canyon, Old Dad-Granite Mountain Range, 28 Apr 1941, *Wolf 10053* (DS, NY, RSA). San Diego Co.: Mission Hills, San Diego, 6 May 1903, *Abrams 3414* (BM, DS, E, F, G, GH, K, MO, NMC, NY, PH, POM, US, Z); Del Mar, 4 Apr 1914, *Clements & Clements 55* (COLO, F, GH, ILL, MICH, MO, NEB, NY, PENN, PH, UCSB); Palomar Mountains, 2.6 mi NE of California Highway 76, 28 Jun 1987, *Reveal & Broome 6616* (CAS, MARY, MICH, MO, NY, RM, RSA, US, WIS); San Felipe Ranch between Julian and Imperial Valley, 20 Mar 1926, *Wiggins 2011* (DS, SD, WTU). San Francisco Co.: Obsolescent Valley, Apr 1892, *Michener & Bioletti s.n.* (BKL, MICH, MIN, MSC, NEB, POM); between Lands End and the Golden Gate Bridge, 18 Mar 1956, *Raven 8866* (CAS). San Joaquin Co.: hill between Castle Rock and Black Butte, Corral Hollow, 9 Apr 1938, *Hoover 3046* (K, NY, UC, US). San Luis Obispo Co.: Baywood Park at Sweet Springs Marsh, S end of Morro Bay, 25 Apr 1981, *Keil 14580* (OBI, UCR); Arroyo de la Cruz 1 mi E of California Highway 1, 18 May 1980, *Keil et al. 13996* (ASU, OBI); La Panza Range, 0.4 mi W of La Panza Summit along the road to La Panza, 26 May 1988, *Reveal 6902* (BM, BRY, CAS, G, MARY, MO, NY, OSC, RM, RSA, US, WIS). San Mateo Co.: Saratoga-Big Basin Road, 23 Jun 1915, *Abrams 5261* (DS, MICH); Franklin Point, 13 May 1961, *Thomas 9333* (DS, OSC, RSA, US). Santa Barbara Co.: W of Canyon del Mar and S of Cuyler Harbor, San Miguel Island, 23 May 1963, *E.R. Blakley 5857* (SBBG); ravine W of Pelican Bay, Santa Cruz Island, 6 Jun 1930, *Clokey 4904* (GH, K, MARY, ND, NY, OKL, PENN, POM, UC, US); Dix Canyon, Santa Barbara Island, 26 May 1930, *Clokey 4906* (ILL, MIN, MO, ND, NY, PENN, RSA, UC, WTU); Santa Rosa Island, 24 May 1931, *N. Dunn s.n.* (LA); West Camino Cielo, 2-3 mi W of California Highway 154, Santa Ynez Mountains, 17 May 1980, *Erter & Strachan 3438* (ASU, BRY, CAS, COLO, CPH, ISC, MARY, MONTU, NESH, NY, RM, SD, TEX, US, UTC, WS, WTU); 4 mi S of Surf, 14 Apr 1929, *Wiggins 3517* (DS, IDS, POM, WTU). Santa Clara Co.: foothills near Stanford University, 15 Apr 1902, *C.F. Baker 615* (G, GH, K, MICH, MO, NDG, NY, POM, UC, US); Stevens Creek, near Soda Rock, 18 May 1907, *Heller 8549* (BKL, DS, E, F, G, GH, ISC, MIN, NY, PH, US, WTU, WU). Santa Cruz Co.: Santa Cruz, 24 Jun 1881, *M.E. Jones 2239* (BM, BR, CAS, DS, G, GB, LE, MIN, MSC, NY, POM, RM, US, UTC); Ben Lomand, 18 Jul 1962, *Rose 62074* (ARIZ, B, BR, CAS, DAO, DS, G, GB, GH, MICH, MIN, NY, OBI, RM, RSA, SMU, TEX, WS, WTU). Shasta Co.: Morley's Station, 22 May 1894, *Baker & Nutting s.n.* (POM, RM, UC). Solano Co.: Gates Canyon, near Vacaville, 27 Apr 1902, *Heller & Brown 5386* (BKL, DS, F, GH, MO, NY, PH, US). Sonoma Co.: Bodega Point, 4 Jul 1900, *Eastwood s.n.* (DS, GH, RM, US, Z); Bodega Bay, 27 May 1902, *Heller & Brown 5612* (B, DS, E, F, G, GH, ILL, LE, MO, NY, PH, POM, US). Stanislaus Co.: Lower Crow Creek Canyon, 7 Apr 1940, *Hoover 4317* (NY, UC, US); 4 mi up Arroyo del Puerto Canyon, 21 Apr 1935, *Sharsmith 1760* (DS, GH, UC, WS). Sutter Co.: 2 mi SE of the Dean Cabin, 2 mi N of Sutter, Sutter Buttes, 5 May 1985, *Ahart 4897* (CHSC, MO); summit of the ridge E of South Butte, Marysville Buttes, 22 Mar 1905, *Heller 7571* (BKL, E, ISC, MIN, PH, NY, US). Tehama Co.: 5 mi W of Paskentain foothills, 26 Apr 1953, *M.O. Baker 12561* (RSA). Tulare Co.: Lindsay, 20 Mar 1925, *Munz 9051* (POM); Kern Canyon, flume road at Corral Creek above Corral Flat, 25 Apr 1971, *Twisselmann 17597* (CAS). Tuolumne Co.: Peñon Blanco Mine near Indian Creek, 11-16 Apr 1919, *Ferris 1526* (CAS, DS, NY, UC); above Rawhide Road, 0.3 mi SW of the Jamestown-Tuttletown Road, NW of Jamestown, 31 Mar 1972, *McNeal 707* (CPH, NY). Unknown Co.: without location data, without date, *Coulter s.n.* (BM, CGE, E, G, GH, K, NY); without location data, without date, *Douglas s.n.* (BM, CGE, GH, K, NY, OXF); without location data, 1876, *Parry & Lemmon 365* (F, ISC, MO, NEB, US). Ventura Co.: S of the lighthouse, East Anacapa Island, 25 Apr 1959, *E.R. Blakley B2776* (SBBG); summit of East Casitas Pass, Santa Ynez Mountains, 19 Apr 1962, *Breedlove 2457* (DS, UCSB); Matilija Canyon, 15 Apr 1945, *Pollard s.n.* (GB). Yuba Co.: near Marysville, May 1854, *Bigelow s.n.* (NY). NEVADA: Clark Co.: near Dripping Springs Canyon, 35 mi SE of Searchlight, 2 Apr 1966,

Cronquist 10606 (BRY, NY, UTC, WTU); Valley of Fire, Atalta Park, 6 Apr 1934, *Maguire et al. 4770* (GH, ND, RM, WS, UTC); Muddy Mountains, N end of Hidden Valley, 11 May 1980, *Swearingen 1433* (ARIZ, RSA, UNLV); S end of Arrow Canyon Range, N of Dry Lake Valley, 15 May 1983, *Tiehm 7616* (BRY, CM, IDS, NY, RSA, UTC). Lincoln Co.: SW side of Meadow Valley Mountains, 11 Apr 1979, *Tiehm & Williams 4784* (MARY, NY, UTC). New Mexico: Unknown Co.: Rio Grande Valley, below Donaña, without date, *Parry et al. 1171* (US). Oregon: Unknown Co.: Columbia River, without date, *Tolmie s.n.* (GH). Utah: Washington Co.: St. George, S slope of Black Hill, 16 Apr 1942, *Gould 1563* (ARIZ, CAS, DS, F, ND, UC, US); St. George, 1 Apr 1880, *M.E. Jones 1618* (ARIZ, BKL, BM, BR, F, G, GB, LE, MICH, MSC, NY, POM, US, UT, UTC); without location data, 1876, *Parry 229* (CM, F, G, MO, NY, PH, US); Cedar Pockets Wash, 5 May 1986, *Welsh & Atwood 23740* (NY). A total of 1259 collections were examined.

The interesting question regarding the typification of *Pterostegia drymarioides* (from the genus name *Drymaria* Willd. ex Schultes (Caryophylloides) and *-oides*, resembling, alluding to the spreading nature of the species) was whether one should select the voucher of the seed collection gathered in the wild by Wrangel or one of the garden specimens made by Fischer and sent to various institution with a variety of dates. The name of the taxon appeared in a treatment of plants grown at the botanic garden in St. Petersburg and there is a garden voucher at LE collected in 1835.

The Wrangel specimen selected here as the lectotype was supposedly collected near Fort Ross and dated 1834. The sheet was named *Pterostegia minutiflora* with the actual location data given as "Lect: in California prope colonoam Ross. Acc. a D. Wrangel, 1834." Fischer and Meyer (1836) give the type location of Bodega Point. It is uncertain which is correct, but given the general statement given to the entire series of species by Fischer and Meyer, it is likely that the reference to Bodega Point was a general one and that the actual place where the type was gathered is near Fort Ross. It is also uncertain if the type specimen was actually gathered in 1834 or if that was the year the voucher arrived at St. Petersburg. According to Ogden (1933), Wrangel was definitely at Fort Ross in 1833 and because it is doubtful a specimen gathered in the summer of 1834 could have made it to St. Petersburg early enough for the seeds to be planted for the 1835 growing season, it is suggested that the type was actually gathered in 1833.

The 1835 garden specimen at LE is here considered to be a syntype but it is unclear how other garden specimens should be regarded. At BM and G are two collections stating "Fischer" and "Bodega." The G sheet is dated 1840 and it is uncertain if that is the year the plants were collected in the garden at St. Petersburg or that was the year the sheet was sent to G. Other specimens at BM and GOET are simply labelled "California." At GOET one sheet is from the Fischer Herbarium with something like "Petrib 36" written on it. Does this mean it is a garden collection gathered at St. Petersburg in 1836? It is assumed here that the Fischer specimens alluding to California and Bodega are not Wrangel isotypes, but rather garden specimens grown from seeds gathered in California.

At K are three sheets of garden specimens grown at Luxembourg. One is dated 25 Aug 1836 and is accompanied by a detail description. On the same sheet is another collection that was apparently gathered in 1837. The second sheet is dated 28 Aug 1836 and associated with it are two sketches; a third sketch was apparently made from a Douglas specimen mounted on the same sheet.

The specimen gathered in 1837 is dated 10 Aug 1837 and the label data state that it was grown from seeds sent to Luxembourg by Fisher. Furthermore, seeds were gathered at Luxembourg on 16 Jun 1837. A third Luxembourg sheet, dated 19 Jul 1836, is also at K.

A Meisner collection (BM) is labelled "Hort. Basil" and dated Sep 1839. It refers to the type location as "Hab in Portu Bodega Nova California," this being taken from a report by Hooker (1836). It is uncertain what the seed source of this collection might have been, but

most likely seeds were sent to Meisner at Basel by Fischer.

It is clear that Fischer widely distributed seeds of *Pterostegia drymarioides*, but it is uncertain at this time if the seeds that went to Luxembourg, for example, were some originally gathered by Wrangel or were taken from the specimens grown at St. Petersburg.

According to Peck (1942), *Pterostegia drymarioides* is found in southeastern Oregon. The only specimen from Oregon discovered during this study is a Tolmie collection supposedly gathered along the Columbia River.

William Frazer Tolmie (1812-1886), a surgeon-naturalist for the Hudson Bay Company, came to the coast of North America in 1833 traveling overland from Fort Vancouver, past Mount Rainier, toward the Puget Sound where he was to remain until the spring of 1836. He stayed on the Columbia River until 1841 when he walked to Fort York on Hudson Bay and sailed for England. In 1843 he returned to Fort Vancouver but almost immediately went to the Puget Sound again to oversee operations at Fort Nisqually. When the international boundary between the United States and Canada was settled, Tolmie moved to Victoria in 1859 where he lived until his retirement in 1870. McKelvey (1955) alludes to an 1840 trip by Tolmie into the Willamette Valley, but there is no indication that Tolmie ever collected in southeastern Oregon.

Thanks to McKelvey (1955) information now exists about a "friend of Mr. Tolmie" who collected specimens for him that eventually found their way into the hands of William Jackson Hooker who, with George Arnott Walker-Arnott, described several as new species in their report on the botany of the Beechey voyage. This was John McLeod who went to the Green River rendezvous representing the Hudson Bay Company. He traveled from Fort Vancouver to the mid July meeting of trappers and fur traders, and returned sometime prior to the end of October in 1837. McLeod was a trapper himself and was certainly inspired by Tolmie to make a small collection during his travels. McKelvey concludes that the trapper went up the Columbia River to Fort Walla Walla, across northeastern Oregon to the Umatilla River and on to the Snake River which he followed to Fort Boisé. On his return trip, McLeod apparently retraced his original path.

It is possible Peck was aware of the Tolmie collection at GH and felt that it could not have been collected on the Columbia River. If he reasoned the specimen was collected by Tolmie's "friend" then perhaps he reasoned it must have come from southeastern Oregon.

An additional possibility is that Tolmie encouraged others to collect for him and somehow he obtained a specimen of *Pterostegia* from someone else. There is no Tolmie specimen among the Hooker specimens at K, E or TCD so there is an additional possibility that the sheet at GH might have been mislabelled.

New Mexico is not included in the distribution of *Pterostegia* even though a specimen is cited in the above exsiccata. The specimen is associated with a label from the United States-México boundary survey, and it is strongly suspected the sheet was actually taken near San Diego in southern California rather than near the Rio Grande in southern New Mexico.

As for the Morelia collection of *Pterostegia* made by Arsené in the state of Michoacán, I cannot account for it. No other specimens of Arsené of the genus are known, but it is known that he collected in the state. There is no indication that the species has been found anywhere else on the mainland of México.

There is considerable variation within *Pterostegia drymarioides* in the size of its parts and the pubescence. No geographic significance has been associated with this variation except that the involucral bracts on plants found on the Mojave Desert tend to be slightly larger than those encountered in the coastal mountains. The species is generally found in cool, moist places in the shade were it spreads over the ground under shrubs. The degree of

available moisture and shade seem to influence the size of individual plants.

Acknowledgments

I wish to thank the curators and staff of the following herbaria for loans or for arranging access to their collections during visits: A, ARIZ, ASC, ASU, B, BKL, BM, BR, BRY, CAN, CAS, CGE, CHSC, CM, COLO, CPH, CS, DAO, DAV, DS, E, F, G, GB, GH, GOET, HSC, ID, IDS, ILL, IND, ISC, JEPS, K, KANS, KSC, L, LL, M, MARY, MICH, MIN, MNA, MO, MONTU, MPU, MSC, ND, NDG, NEB, NESH, NMC, NO, NTS, NY, OBI, OKL, OKLA, ORE, OSC, OXF, P, PENN, PH, POM, RENO, RM, RSA, SBBG, SD, SFSU, TCD, TEX, UC, UCR, UCSB, UNLV, US, USFS, UT, UTC, VT, W, WILLU, WIS, WS, WTU, WU, and Z. Individuals wishing a complete list of herbarium specimens examined may request a copy. Funding for field work has been made possible through a variety of sources. I would like to thank Dr. Edward E. Terrell and Clare B. Hardham for their review comments. This is Scientific Article A-4945, Contribution 7988, Maryland Agricultural Experiment Station.

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